

Serial Number 10/525,317

05129-00089

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

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In re Patent Application of  
Eberhard Piepho et al.

Application No.: 10/525317

Group Art Unit: 1621

Filed: February 23, 2005

Examiner: PARSA

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For: PROCESS FOR THE MANUFACTURE OF  
PENTAFLUOROETHANE

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**1.312 DECLARATION**

MS PCT  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Dear Sir:

1. I, Véronique Mathieu, reside in Wavre BELGIUM, am an inventor on over 40 world wide patent applications with several of the patent applications relating to fluorinated organic compounds (see Appendix A for the list). I am an expert in the art of making fluorinated organic compounds.

2. I have reviewed and understood the contents of US patent application Ser. No 10/525,317 ('317 application) and of the prior art document US patent No. 5,969,199 (Franz). The European counterpart of Franz (EP -A-634383) is discussed in the '317 application at page 1, lines 10-13.

3. I confirm that the example 10 of the Franz reference uses substantially the same reagent ((n-C4H9)<sub>3</sub>N.2.4 HF) as example 5 of the patent application.

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4. According to my experience, the difference between the reactions described in example 10 of the Franz and example 5 of the patent application which would be considered by a skilled person to have the most important impact on the result of the process is the difference of the reaction temperature which is 65°C higher in the patent application than in Franz.

5. Example 5 of the patent application shows complete conversion of tetrafluoroethylene to HFC-125 with a highly increased volumic productivity and without formation of by-products. The reaction system shows no deactivation after 550 hours of trial. The volumic productivity of Example 5 was 0.17 mol per hour and per litre of complex.

6. In example 10 of Franz, the calculated productive output of HFC-125 is about 0.040 mol per hour and per liter of reaction medium. Based upon the indications in said example, I calculated the maximum volumic productivity of Franz as follows : I calculated first the volume of the liquid in the reactor by multiplying  $r^2 \times \pi \times h$ ,  $r$  being the half cross section (11 mm) and the fill height of 1.5 m. Based upon the indication that, in the Franz example, the residence time passage is 10 s and the effective total residence time is 180 s (3 min), I calculated that 18 passages of tetrafluoroethylene were required to reach that time. I assumed that the maximum circulation rate of tetrafluoroethylene was used in the Franz example (8 l/h) so as to evaluate the maximum volumic productivity that can be reached according to that example. Passing 1.5 l of tetrafluoroethylene 18 times through the reactor at a pumping rate of 8 l/h requires about 3 (3.4) hours. 1.5 l of tetrafluoroethylene corresponds to 0.07 mol tetrafluoroethylene in the normal conditions. The example indicates a conversion of 97 % into HFC-125 what corresponds to 0.065 mol. Dividing 0.065 mol of HFC-125 by the volume of the liquid complex (0.57 l) gives

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a yield of 0.11 mol HFC-125/l complex. Dividing 0.11 mol HFC-125/l complex through the time required to pass the tetrafluoroethylene 18 times through the reactor as calculated above gives a maximum volumic productivity according to the Franz example of 0.04 mol HFC-125/l complex/h.

7. The effects outlined under point 5 are unpredictable from example 10 of the FRANZ reference. In fact a skilled person would expect that the selectivity of reaction decreases as the reaction temperature is increased. Decrease of selectivity affects negatively the yield and thus the volumic productivity would be lowered.

8. Moreover, the skilled person would expect that deactivation of amine hydrofluoride would occur more easily through degradation of amine hydrofluoride when operating at higher reaction temperature. This would also lead to less volumic productivity.

9. Consequently, the effects outlined under point 5 are could not be expected by a skilled person considering the disclosure of the Franz reference.

10. Changing the temperature has achieved unexpected and superior results with respect to the volumic productivity (0.17 versus 0.040 mol per hour and per litre of complex).

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18

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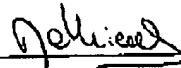
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of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

24 / 02 / 2006

DATE



Véronique Mathieu

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#### RESULT LIST

Approximately 42 results found in the Worldwide database for:  
**mathieu veronique** as the inventor  
(Results are sorted by date of upload in database)

- 1 Process for preparing halogenated hydrocarbons**  
Inventor: MATHIEU VERONIQUE (BE); SCHOEBRECHTS JEAN-PAUL (BE)  
EC: C07C17/275; C07C17/278; (+2) IPC: C07C17/275; C07C17/278; C07C17/383 (+3)  
Publication info: DE69921269T - 2006-02-16
- 2 METHOD FOR PRODUCING 1,1,1-TRIFLUOROETHANE**  
Inventor: MATHIEU VERONIQUE (BE); MROSS STEFAN (BE)  
EC: B01J23/00B; B01J23/26; (+1) IPC: B01J23/00; B01J23/26; C07C17/20 (+5)  
Publication info: EP1603854 - 2005-12-14
- 3 METHOD FOR PRODUCING HYDROFLUOROALKANE**  
Inventor: JANSSENS FRANCINE; MATHIEU VERONIQUE (BE)  
EC: C07C17/386; C07C17/42; (+1) IPC: C07C17/386; C07C17/42; C07C19/08 (+4)  
Publication info: JP2005213253 - 2005-08-11
- 4 METHOD OF PRODUCING AN ORGANIC COMPOUND COMPRISING AT LEAST ONE OXYGENATED FUNCTIONAL GROUP**  
Inventor: BUYLE OLIVIER (BE); MATHIEU VERONIQUE (BE); (+1)  
EC: C07C315/02; C07D301/14 IPC: C07C315/02; C07D301/14; C07C317/04 (+9)  
Publication info: WO2004106313 - 2004-12-09
- 5 PROCESS FOR THE MANUFACTURE OF FOAMS COMPOSED OF POLYURETHANE OR OF MODIFIED POLYURETHANE**  
Inventor: DOURNEL PIERRE (BE); MATHIEU VERONIQUE (BE)  
EC: C08G18/00D; C08G18/40A2 IPC: C08G18/00; C08G18/40; C08G18/00 (+2)  
Publication info: WO2004085509 - 2004-10-07
- 6 Method for preparing a halogenated olefin**  
Inventor: MATHIEU VERONIQUE (BE)  
EC: C07C17/08; C07C17/20D4; (+2) IPC: C07C17/08; C07C17/20; C07C17/278 (+4)  
Publication info: US2004116754 - 2004-06-17
- 7 PROCESS FOR PREPARING SO2F2 AND SO2CLF**  
Inventor: MATHIEU VERONIQUE (BE); LAMBERT ALAIN (BE)  
EC: C01B17/45 IPC: C01B17/45; C01B17/00; (IPC1-7): C01B17/45 (+1)  
Publication info: WO2004018357 - 2004-03-04
- 8 Manufacturing foams for making supported foam, by reacting polyol(s) with isocyanate(s) in presence of catalyst, polyepoxide, blowing agent other than chlorofluorocarbon and/or flammable blowing agent**  
Inventor: DOURNEL PIERRE; MATHIEU VERONIQUE  
EC: C08G18/00D; C08G18/09D; (+1) IPC: C08G18/00; C08G18/09; C08G18/40 (+5)  
Publication info: FR2852962 - 2004-10-01
- 9 Process for the synthesis of fluoroorganic compounds**  
Inventor: MATHIEU VERONIQUE (BE); JANSSENS FRANCINE (BE); (+1)  
EC: C07C53/21; C07C67/307; (+3) IPC: C07C53/21; C07C67/307; C07C67/317 (+10)  
Publication info: US2004024243 - 2004-02-05
- 10 Process for preparing haloalkanes**

Inventor: MATHIEU VERONIQUE (BE); ANCIAUX  
CHARLES-MARIE (FR)  
EC: C07C17/278

Applicant: SOLVAY (US)

IPC: C07C17/08; C07C17/20; C07C17/275 (+11)

Publication info: US6369285 - 2002-04-09

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**RESULT LIST**

Approximately 35 results found in the Worldwide database for:  
**mathieu veronique** as the Inventor  
(Results are sorted by date of upload in database)

- 11 Process for preparing haloalkylcarbons in the presence of a co-catalyst**  
Inventor: LAMBERT ALAIN (BE); MATHIEU VERONIQUE Applicant: SOLVAY (US)  
(BE); (+1)  
EC: B01J31/22B2; C07C17/275; (+1) IPC: B01J31/22; C07C17/275; C07C17/278 (+6)  
Publication Info: US6452057 - 2002-09-17
- 12 METHOD FOR OBTAINING HALOGENATED HYDROCARBONS IN THE PRESENCE OF A CO-CATALYST**  
Inventor: LAMBERT ALAIN (BE); MATHIEU VERONIQUE Applicant: SOLVAY (BE)  
(BE); (+1)  
EC: IPC: B01J31/40; C07C17/275; C07C17/278 (+10)  
Publication Info: EP1222153 - 2002-07-17
- 13 METHOD FOR PREPARING HALOGENATED HYDROCARBONS**  
Inventor: MATHIEU VERONIQUE (BE); ANCIAUX Applicant: SOLVAY (BE)  
CHARLES-MARIE (FR)  
EC: IPC: C07C17/20; C07C17/275; C07C17/278 (+9)  
Publication Info: EP1222154 - 2002-07-17
- 14 No English title available**  
Inventor: MATHIEU VERONIQUE (BE); ANCIAUX Applicant: SOLVAY (BE)  
CHARLES-MARIE (BE)  
EC: C07C17/278 IPC: C07C17/08; C07C17/20; C07C17/275 (+14)  
Publication Info: AT267790T - 2004-06-15
- 15 Lavatory cleansing block having two fragrance regions**  
Inventor: PERTHUISOT CHRISTOPHE (FR); MATHIEU Applicant: RECKITT BENCKISER FRANCE (FR)  
VERONIQUE (FR)  
EC: A61L9/05; C11D3/50; (+1) IPC: A61L9/05; C11D3/50; C11D17/00 (+4)  
Publication Info: US6376442 - 2002-04-23
- 16 Method for preparing of halogenated hydrocarbons**  
Inventor: MATHIEU VERONIQUE (BE); JANSSENS Applicant: SOLVAY (US)  
FRANCINE (BE)  
EC: C07C17/275; C07C17/278 IPC: C07C17/275; C07C17/278; C07C17/00 (+2)  
Publication Info: US6441256 - 2002-08-27
- 17 Method for the preparation of 1,1,1,3,3-pentachlorobutane**  
Inventor: SCHOEBCRECHTS JEAN-PAUL (BE); MATHIEU Applicant: SOLVAY (US)  
VERONIQUE (BE); (+1)  
EC: C07C17/275; C07C17/278 IPC: C07C17/275; C07C17/278; C07C17/00 (+2)  
Publication Info: US6399840 - 2002-06-04
- 18 Method for preparing halogenated hydrocarbons**  
Inventor: MATHIEU VERONIQUE (BE); JANSSENS Applicant: SOLVAY (US)  
FRANCINE (BE)  
EC: C07C17/275; C07C17/278 IPC: C07C17/275; C07C17/278; C07C17/00 (+2)  
Publication Info: US6399839 - 2002-06-04
- 19 No English title available**  
Inventor: MATHIEU VERONIQUE (BE); SCHOEBCRECHTS Applicant: SOLVAY (BE)  
JEAN-PAUL (BE)  
EC: C07C17/275; C07C17/278; (+2) IPC: C07C17/275; C07C17/278; C07C17/383 (+7)  
Publication Info: AT280145T - 2004-11-15
- 20 Hydrogenation catalysts, method for making same and use thereof for**

**preparing hydrogen peroxide**

**Inventor:** MATHIEU VERONIQUE (BE); PENNETREAU  
PASCAL (BE); (+1)

**Applicant:** SOLVAY INTEROX SOC ANON (US)

**EC:** B01J23/48; B01J23/89; (+1)

**IPC:** B01J23/48; B01J23/89; B01J37/02 (+5)

**Publication info:** US6306359 - 2001-10-23

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**RESULT LIST**

Approximately 35 results found in the Worldwide database for:  
**mathieu veronique** as the inventor  
(Results are sorted by date of upload in database)

- 21 A LAVATORY CLEANSING BLOCK**  
Inventor: PERTHUISOT CHRISTOPHE (FR); MATHIEU VERONIQUE (FR) Applicant: RECKITT BENCKISER FRANCE (FR)  
EC: IPC: A61L9/01; C11D3/50; C11D17/00 (+6)  
Publication Info: EP1051477 - 2000-11-15
- 22 A lavatory cleansing block**  
Inventor: PERTHUISOT CHRISTOPHE; MATHIEU VERONIQUE Applicant: RECKITT BENCKISER FRANCE  
EC: A61L9/05; C11D3/50; (+1) IPC: A61L9/05; C11D3/50; C11D17/00 (+6)  
Publication Info: AU756541B - 2003-01-16
- 23 Process for the preparation of halohydrocarbons.**  
Inventor: MATHIEU VERONIQUE; JANSSENS FRANCINE Applicant: SOLVAY  
EC: IPC: C07C; (IPC1-7): C07C  
Publication Info: ZA9807088 - 2000-02-07
- 24 Process for the preparation of halohydrocarbons**  
Inventor: MATHIEU VERONIQUE (BE); JANSSENS FRANCINE (BE) Applicant: SOLVAY (BE)  
EC: C07C17/275; C07C17/278 IPC: C07C17/275; C07C17/278; C07C17/00 (+1)  
Publication Info: TW222432B - 2004-10-21
- 25 A lavatory block**  
Inventor: PERTHUISOT CHRISTOPHE; MATHIEU VERONIQUE Applicant: RECKITT & COLMAN FRANCE (FR)  
EC: C11D3/50; C11D17/00H4 IPC: C11D3/50; C11D17/00; C11D3/50 (+2)  
Publication Info: GB2333778 - 1999-08-04
- 26 Process for the preparation of 1,1,1,3,3-pentachlorobutane.**  
Inventor: SCHOEBCRECHTS JEAN-PAUL; MATHIEU VERONIQUE; (+1) Applicant: SOLVAY  
EC: C07C17/275; C07C17/278 IPC: C07C17/275; C07C17/278; C07C17/00 (+1)  
Publication Info: ZA9803781 - 1999-11-05
- 27 Process for the manufacture of 1,1,1,3,3-pentachlorobutane**  
Inventor: SCHOEBCRECHTS JEAN-PAUL (BE); MATHIEU VERONIQUE (BE); (+1) Applicant: SOLVAY (BE)  
EC: C07C17/275; C07C17/278 IPC: C07C17/275; C07C17/278; C07C17/00 (+2)  
Publication Info: TW467762B - 2001-12-11
- 28 Process for the manufacture of halogenated hydrocarbons**  
Inventor: MATHIEU VERONIQUE (BE); JANSSENS FRANCINE (BE) Applicant: SOLVAY (BE)  
EC: C07C17/275; C07C17/278 IPC: C07C17/275; C07C17/278; C07C17/00 (+1)  
Publication Info: TW570910B - 2004-01-11
- 29 METHOD OF OBTAINING 1,1,1,3,3- PENTACHLOROBUTANE**  
Inventor: SCHOEBCRECHTS JEAN-PAUL (BE); MATHIEU VERONIQUE (BE); (+1) Applicant: SOLVAY (BE)  
EC: IPC: C07C17/278; C07C19/01; C07C17/00 (+3)  
Publication Info: PL336664 - 2000-07-03
- 30 Method for preparing 1,1,1,3,3-pentachlorobutane**  
Inventor: SCHOEBCRECHTS JEAN-PAUL; MATHIEU VERONIQUE; (+1) Applicant: SOLVAY  
EC: C07C17/275; C07C17/278 IPC: C07C17/275; C07C17/278; C07C17/00 (+2)

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Publication info: AU743129B - 2002-01-17

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**RESULT LIST**

36 results found in the Worldwide database for:  
**mathieu veronique** as the inventor  
(Results are sorted by date of upload in database)

- 31 No English title available**  
Inventor: MATHIEU VERONIQUE (BE); JANSSENS FRANCINE (BE)  
EC: C07C17/275; C07C17/278  
Publication Info: AT264285T - 2004-04-15  
Applicant: SOLVAY (BE)  
IPC: C07C17/275; C07C17/278; C07C17/00 (+4)
- 32 No English title available**  
Inventor: SCHOECHRECHTS JEAN-PAUL (BE); MATHIEU VERONIQUE (BE); (+1)  
EC: C07C17/275; C07C17/278  
Publication Info: AT229491T - 2002-12-15  
Applicant: SOLVAY (BE)  
IPC: C07C17/275; C07C17/278; C07C17/00 (+2)
- 33 Halogenated hydrocarbon preparation method**  
Inventor: MATHIEU VERONIQUE (BE); JANSSENS FRANCINE (BE)  
EC: C07C17/275; C07C17/278  
Publication Info: BE1012972 - 2001-07-03  
Applicant: SOLVAY (BE)  
IPC: C07C17/275; C07C17/278; C07C17/00 (+2)
- 34 1,1,1,3,3-pentachlorobutane preparation method**  
Inventor: SCHOECHRECHTS JEAN-PAUL (BE); MATHIEU VERONIQUE (BE); (+1)  
EC: C07C17/278  
Publication Info: BE1011758 - 1999-12-07  
Applicant: SOLVAY (BE)  
IPC: C07C17/278; C07C17/00; (IPC1-7): C07C17/278 (+1)
- 35 Hydrogenation catalysts and use thereof to prepare hydrogen peroxide**  
Inventor: MATHIEU VERONIQUE (BE)  
EC: B01J23/48; B01J23/89; (+1)  
Publication Info: BE1010665 - 1998-11-03  
Applicant: SOLVAY INTEROX (BE)  
IPC: B01J23/48; B01J23/89; B01J37/02 (+5)
- 36 NUCLEIC ACID FRAGMENTS, DERIVATIVES OF THE MYCOBACTERIUM XENOPHILUM GENOME, AND APPLICATIONS THEREOF**  
Inventor: PICARDEAU MATHIEU (FR); VINCENT VERONIQUE (FR)  
EC: C07K14/35; C12Q1/68M10B  
Publication Info: WO9600299 - 1996-01-04  
Applicant: PASTEUR INSTITUT (FR); PICARDEAU MATHIEU (FR); (+1)  
IPC: C07K14/35; C12Q1/68; C07K14/195 (+3)

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